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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,814	10/23/2003	Heizaburo Kato	371312002100	5429

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EXAMINER

PILKINGTON, JAMES

ART UNIT	PAPER NUMBER
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3682

DATE MAILED: 11/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/690,814		KATO, HEIZABURO	
	<b>Examiner</b>		<b>Art Unit</b>	
	James Pilkington		3682	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 October 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 11-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 11-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10.23.2003 and 10.30.2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the helical shape of the cam groove varying (clm 12) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

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2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 11 and 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Re clm 11, the preceding claim (clm 1) recites "wherein said two adjacent rolling cam followers roll on respective ones of said opposed inner surface of said cam groove" (see 112 2<sup>nd</sup> paragraph rejection below). The examiner is taking this to mean that a cam follower contacts respective sides of the groove (left and right side of groove) and that the adjacent cam follower also contacts the sides of the groove at a different point, in other words the cams contact both sides of the groove. If cams contact both the left and right sides of the cam groove how are the cams spaced apart by different pitches, as stated in claim 2, when they are installed in a fixed pitch of the cam groove?

Re clm 12, the specification does not disclose that how the helical shape of the cam grooves is varied. Is the helical shaped varied by making sections of the groove wider or by changing the pitch of the groove? The specification appears to be disclosing that the helical shape varies in cross section as it rotates and it is known that a helical shape varies as it rotates because the groove location will translate.

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4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 11-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re clms 1, 11 and 12, it is not clear to the examiner what the applicant means by "wherein said two adjacent rolling cam followers roll on respective ones of said opposed inner side surfaces of said cam groove." What does the applicant mean by respective "ones?"

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 12-14 and 17, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Galloway, USP 4,898,044.

Re clms 1, 12-14 and 17, Galloway discloses a drive mechanism interposed between two members (base 32 and carriage 40) said two members move relatively with respect to each other, at least one of said two members being guided to move linearly (carriage 40) in a linear moving direction said drive mechanism comprising:

- A plurality of rolling cam followers (38) that are rotatably supported to one of said two members (36, side wall of base 32), that are arranged in said linear moving direction, and that are space from each other
- A cam (48) that is rotatably supported on the other one of said two members (carriage 40) and that is provided in its circumference with a cam groove (see Figures 4 and 5) in which said rolling cam followers (38) engage, said cam groove being defined by a pair of linear side surfaces opposing each other and a bottom surface connecting said surfaces (between each cam element 80 there is a left wall, a right wall and a base, the base connects the left and right walls), the rotation axis of said cam (48) being arranged in the direction of said linear moving direction
- Two adjacent rolling cam followers (38) being engaged in said cam groove simultaneously (C5/L50-55)
- The rolling cam followers (38) contact the inner sides of the cam groove
- The rolling cam followers (38) are arranged at equal pitches (C4/L55-57), a helical shape of the cam groove varies (as it rotates)
- both ends, in the direction of said rotation axis, of said cam (48) are supported rotatably; said cam groove (Figures 4 and 5) is formed in the circumference of said cam throughout the length, in the direction of said rotation axis, of said cam (48); said cam groove is a helical groove oriented toward one direction in the circumferential direction of said cam (48) and before a cam follower (38) that is engaged in said cam groove

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disengages from said cam groove, an adjacent cam follower engages in said cam groove (C4/L55-57, "equally-spaced" one will be disengaging well another is engaging)

- wherein said length, in the direction of said rotation axis, of said cam (48) is set shorter than a stroke of the linear movement of said member (40) (the cam is shorter than the total possible travel)
- one of said two members (base 32) that rotatably supports said cam followers is a base fixedly installed on a floor; and the other one of said two members (40) that rotatably supports said cam is a table (carriage 40 has a table top 46) supported on said base to move linearly

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 11, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Galloway '044 in view of Parsons, USP 5,860,324.

Galloway discloses all of the claimed subject matter as described above.

Galloway further discloses the use of a first pitch (spacing between cams).

Galloway does not disclose alternating a long pitch with a short (first) pitch.

Parsons teaches using a long pitch (Figure 5) for the purpose of reducing backlash between the stationary member and the moving member (screw and nut, C8/L21-48)

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Galloway and provide for the cam followers to alternate between a long pitch and a short pitch, as taught by Parsons, for the purpose of providing a pair of cams that would reduce backlash between the stationary member and the moving member.

10. Claim 15, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Galloway '044 in view of Maroth, USP 3,296,880.

Galloway discloses all of the claimed subject matter as described above. Galloway further discloses that the cam followers are arranged in a linear moving direction to form a row (see Figure 1).

Galloway does not disclose two rows of cam followers aligned next {parallel} to each other in said linear moving direction.

Maroth teaches two rows of cam followers (112, see Figure 13) aligned next {parallel} to each other in said linear moving direction for the purpose providing of increasing the load capacity of the drive assembly (more cams means great load C4/L5-11)

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Galloway and provide two rows of cam



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followers, as taught by Maroth, for the purpose of providing a drive assembly that can handle a greater load.

11. Claim 16, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Galloway '044 in view of Kennedy, USP PGPub 2001/0042417.

Galloway discloses all of the claimed subject matter as described above.

Galloway also discloses that the cam follower (38) has a tapered cylindrical shape (Figure 3, end of the cylindrical portion is curved/tapered inward).

Galloway does not disclose that the cam groove is a tapered groove in which the width of the groove narrows toward the bottom in depth.

Kennedy teaches the cam groove (Figure 3) is a tapered groove in which the width of the groove narrows toward the bottom in depth for the purpose of connecting two gear arrangements (C1/L45-65).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Galloway and provide for the cam groove to be a tapered groove in which the width of the groove narrows toward the bottom in depth, as taught by Kennedy, for the purpose of connecting two gear arrangements.

12. Claim 18, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Galloway '044 in view of Yanagisawa, USP 6,327,929.

Galloway discloses all of the claimed subject matter as described above.

Galloway does not disclose a plurality of movable table units that are stacked in multiple layers so that said moveable table units move with respect to each other in different directions.

Yanagisawa teaches a plurality of movable table units (See Figure 1, one arranged in the x position and one in the y position) that are stacked in multiple layers so that said moveable table units move with respect to each other in different directions (see Figure 1) for the purpose of providing a two-dimensional drive system with improved positioning accuracy (C2/L46-50).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Galloway and provide a plurality of movable table units that are stacked in multiple layers so that said moveable table units move with respect to each other in different directions, as taught by Yanagisawa, for the purpose of providing a two-dimensional drive system with improved positioning accuracy.

### ***Response to Arguments***

13. Applicant's arguments filed 10/30/06 have been fully considered but they are not persuasive.

Applicant only argues that Galloway fails to teach or suggest two adjacent rolling cam followers roll on 'respective ones' of said opposed inner side surfaces of said cam groove.

The examiner argues that Galloway does indeed disclose that the two adjacent rolling cam followers roll on 'respective ones' of said opposed inner side surfaces of said cam groove. Galloway clear states the followers 38 engage in the groove and cause the table to move linearly when the cam groove rotates. If there was no connection between the cams and the groove the table would not move linearly since the cams would have nothing to push off of.

### ***Conclusion***

Applicant's amendment (new claims 11-18) necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Pilkington whose telephone number is (571) 272-5052. The examiner can normally be reached on Monday-Friday 8:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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11/16/06

  
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SUPERVISORY PATENT EXAMINER